



STIC Search Report

EIC 1700

STIC Database Tracking Number: 125583

To: Dawn Garrett
Location: REM 5C75
Art Unit : 1774
June 30, 2004
Case Serial Number: 10/729246

From: John Calve
Location: CP 3/4; 3D62
Phone: 308-4139

John.Calve@uspto.gov

Search Notes

Hi Dawn,

I left you a note at the beginning of the handout. If you have any questions, please feel free to call me at your convenience.

John

703-308-4139.

Access DB# 125583

SEARCH REQUEST FORM

Scientific and Technical Information Center

Requester's Full Name: DAWN GARRETT Examiner #: 76107 Date: June 24, 2004
Art Unit: 1774 Phone Number # 272-1523 Serial Number: 10/729,246
Mail Box and Bldg/Room Location: Rm 5C75 Results Format Preferred (circle): PAPER DISK E-MAIL

If more than one search is submitted, please prioritize searches in order of need.

Please provide a detailed statement of the search topic, and describe as specifically as possible the subject matter to be searched. Include the elected species or structures, keywords, synonyms, acronyms, and registry numbers, and combine with the concept or utility of the invention. Define any terms that may have a special meaning. Give examples or relevant citations, authors, etc. if known. Please attach a copy of the cover sheet, pertinent claims, and abstract.

Title of Invention: Electroluminescent Device Containing Organometallic Compound w/ Tridentate Ligand
Inventors (please provide full names):

Allan Sowinski, Joseph Deaton, Shouquan Huo

Earliest Priority Filing Date: 12/5/2003

For Sequence Searches Only Please include all pertinent information (parent, child, divisional, or issued patent numbers) along with the appropriate serial number.

Please search the organometallic complex described in claim 1. (Include the specific search of formula (1a)).

11-312,415
Thank you.

STAFF USE ONLY

	Type of Search	Vendors and cost where applicable
Searcher: <u>John Colvin</u>	NA Sequence (#) <u>3</u>	STN <u>/</u>
Searcher Phone #:	AA Sequence (#)	Dialog
Searcher Location:	Structure (#) <u>/</u>	Questel/Orbit
Date Searcher Picked Up: <u>6/29/04</u>	Bibliographic	Dr. Link
Date Completed: <u>6/29/04</u>	Litigation	Lexis/Nexis
Searcher Prep & Review Time: <u>120</u>	Fulltext	Sequence Systems
Clerical Prep Time:	Patent Family	WWW/Internet
Online Time: <u>60</u>	Other	Other (specify) <u>187.32</u>

HI DAWN,

I HAVEN'T LOOKED AT EVERY RECORD, BUT I THINK YOU MAY HAVE AN ALLOWANCE. I DID NOT SEE ANY ANSWERS WHERE THE Pt IS BONDED TO ONE nitrogen in one 5-membered ring, and in the other ring Pt is bonded to TWO Nitrogens.

The closest structures I saw was were the Pt is bonded directly to 2 nitrogens in each of the 5 member rings. It was also rare to see the Pt situated in the fused position between the 5 member rings. Most times I found the Pt/Pd in a different position.

John

=> d his

(FILE 'HOME' ENTERED AT 08:33:18 ON 30 JUN 2004)

FILE 'LREGISTRY' ENTERED AT 08:33:30 ON 30 JUN 2004
L1 STR

FILE 'REGISTRY' ENTERED AT 08:36:29 ON 30 JUN 2004
L2 SCR 1918
L3 50 S L1 AND L2

FILE 'LREGISTRY' ENTERED AT 08:37:20 ON 30 JUN 2004
L4 SCR 1860
L5 SCR 1965

FILE 'REGISTRY' ENTERED AT 08:54:54 ON 30 JUN 2004
L6 50 S L1 AND L4 AND L5
L7 SCR 1996
L8 50 S L1 AND L4 AND L5 NOT L7

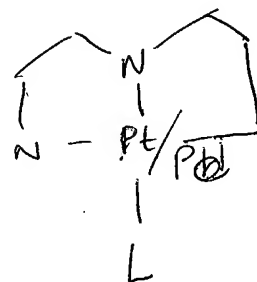
FILE 'LREGISTRY' ENTERED AT 08:56:46 ON 30 JUN 2004
L9 SCR 2111
L10 SCR 1901

FILE 'REGISTRY' ENTERED AT 09:09:40 ON 30 JUN 2004
L11 50 S L1 AND L4 AND L5 AND L9 AND L10
L12 5514 S L1 AND L4 AND L5 AND L9 AND L10 FULL
SAVE L12 GARR246/A
L13 1727 S L12 AND 2-10/M
L14 3787 S L12 NOT L13

FILE 'LREGISTRY' ENTERED AT 09:13:12 ON 30 JUN 2004

FILE 'REGISTRY' ENTERED AT 09:16:20 ON 30 JUN 2004
L15 1932 S L14 AND 6-20/N
L16 1855 S L14 NOT L15

FILE 'LREGISTRY' ENTERED AT 09:17:29 ON 30 JUN 2004
L17 STR L1



L18 SCR 2089
L19 SCR 382

FILE 'REGISTRY' ENTERED AT 09:25:40 ON 30 JUN 2004
L20 50 S L17 AND L19 SSS SAM SUB=L12
L21 16 S L16 AND L20

FILE 'LREGISTRY' ENTERED AT 09:26:42 ON 30 JUN 2004
L22 STR L17

FILE 'REGISTRY' ENTERED AT 09:29:42 ON 30 JUN 2004
L23 50 S L22 AND L19 SSS SAM SUB=L12

FILE 'REGISTRY' ENTERED AT 09:30:16 ON 30 JUN 2004

FILE 'LREGISTRY' ENTERED AT 09:36:10 ON 30 JUN 2004
L24 STR L22

FILE 'REGISTRY' ENTERED AT 09:38:09 ON 30 JUN 2004
L25 0 S L24 AND L19 SSS SAM SUB=L12
L26 SCR 1996
L27 0 S L24 AND L19 NOT L26 AND L4 SSS SAM SUB=L12
L28 50 S L17 AND L19 AND L4 SSS SAM SUB=L12
L29 44 S L17 AND L19 NOT L26 SSS SAM SUB=L12

FILE 'LREGISTRY' ENTERED AT 09:43:25 ON 30 JUN 2004

FILE 'REGISTRY' ENTERED AT 09:48:50 ON 30 JUN 2004
L30 44 S L17 AND L19 NOT L26 SSS SAM SUB=L12
L31 978 S L17 AND L19 NOT L26 SSS FULL SUB=L12
SAVE L31 GARR246A/A
L32 0 S L15 AND L31
L33 739 S L16 AND L31

FILE 'LREGISTRY' ENTERED AT 09:51:58 ON 30 JUN 2004
L34 SCR 437 OR 331 OR 389 OR 2086 OR 2085 OR 446 OR 2090
L35 3 S L17 AND L19 NOT L34 OR L26 SSS SAM

FILE 'REGISTRY' ENTERED AT 10:38:41 ON 30 JUN 2004
L36 50 S L17 AND L19 NOT L34 OR L26 SSS SAM
L37 50 S L17 AND L19 NOT L34 OR L26 SSS SAM SUB=L12
L38 11 S L17 AND L19 NOT (L34 OR L26) SSS SAM SUB=L12

FILE 'LREGISTRY' ENTERED AT 10:41:06 ON 30 JUN 2004

FILE 'REGISTRY' ENTERED AT 10:42:56 ON 30 JUN 2004
L39 1 S L38 AND DIPERCHLORATE

FILE 'LREGISTRY' ENTERED AT 10:43:34 ON 30 JUN 2004

FILE 'REGISTRY' ENTERED AT 10:44:49 ON 30 JUN 2004
E C10 H16 BR N2 O4 PT/MF
L40 1 S E3
L41 251831 S 180/RID
L42 823 S L12 AND L41
L43 121 S L31 AND L41

FILE 'HCA' ENTERED AT 10:51:55 ON 30 JUN 2004

L44 44 S L43
 L45 231 S L42
 L46 599833 S EL OR E(W)L OR ELECTROLUM!N? OR ORGANOLUM!N? OR (ELECTRO OR O
 L47 109516 S EL OR E(W)L OR ELECTROLUM!N? OR ORGANOLUM!N? OR (ELECTRO OR O
 L48 0 S L45 AND L47
 L49 0 S L44 AND L47
 L50 1755 S L12
 L51 16 S L50 AND L47
 L52 1 S L31 AND L47

FILE 'REGISTRY' ENTERED AT 10:54:00 ON 30 JUN 2004

=> d que stat L31

L1 STR

$\text{C} \begin{smallmatrix} \nearrow \\ \searrow \end{smallmatrix} \text{N} \begin{smallmatrix} \nearrow \\ \searrow \end{smallmatrix} \text{C}$ $\text{C} \begin{smallmatrix} \nearrow \\ \searrow \end{smallmatrix} \text{N} \begin{smallmatrix} \nearrow \\ \searrow \end{smallmatrix} \text{C}$ G1 8 Pd @10 Pt @12
 1 2 3 5 6 13

VAR G1=10/12

NODE ATTRIBUTES:

NSPEC IS RC AT 10

NSPEC IS RC AT 12

DEFAULT MLEVEL IS ATOM

DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:

RING(S) ARE ISOLATED OR EMBEDDED

NUMBER OF NODES IS 9

STEREO ATTRIBUTES: NONE

L4 SCR 1860

L5 SCR 1965

L9 SCR 2111

L10 SCR 1901

L12 5514 SEA FILE=REGISTRY SSS FUL L1 AND L4 AND L5 AND L9 AND L10

L17 STR

$\text{C} \begin{smallmatrix} \nearrow \\ \searrow \end{smallmatrix} \text{N} \begin{smallmatrix} \nearrow \\ \searrow \end{smallmatrix} \text{C}$ $\text{C} \begin{smallmatrix} \nearrow \\ \searrow \end{smallmatrix} \text{N} \begin{smallmatrix} \nearrow \\ \searrow \end{smallmatrix} \text{C}$ G1 8 Pd @10 Pt @12
 1 2 3 5 6 13

VAR G1=10/12

NODE ATTRIBUTES:

NSPEC IS R AT 10

NSPEC IS R AT 12

DEFAULT MLEVEL IS ATOM

DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:

RING(S) ARE ISOLATED OR EMBEDDED

NUMBER OF NODES IS 9

STEREO ATTRIBUTES: NONE

L19 SCR 382

L26 SCR 1996

L31 978 SEA FILE=REGISTRY SUB=L12 SSS FUL L17 AND L19 NOT L26

100.0% PROCESSED 1095 ITERATIONS

978 ANSWERS

SEARCH TIME: 00.00.01

=> file hca

FILE 'HCA' ENTERED AT 10:55:37 ON 30 JUN 2004

USE IS SUBJECT TO THE TERMS OF YOUR STN CUSTOMER AGREEMENT.

PLEASE SEE "HELP USAGETERMS" FOR DETAILS.

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FILE COVERS 1907 - 24 Jun 2004 VOL 141 ISS 1

FILE LAST UPDATED: 24 Jun 2004 (20040624/ED)

This file contains CAS Registry Numbers for easy and accurate substance identification.

=> d L51 1-16 cbib abs hitind hitstr

L51 ANSWER 1 OF 16 HCA COPYRIGHT 2004 ACS on STN

140:329234 Highly efficient organic electrophosphorescent **light-emitting** diodes with a reduced quantum efficiency roll off at large current densities. Cocchi, M.; Fattori, V.; Virgili, D.; Sabatini, C.; Di Marco, P.; Maestri, M.; Kalinowski, J. (Institute of Organic Synthesis and Photoreactivity, National Research Council of Italy (CNR-ISOF), Bologna, I-40129, Italy). Applied Physics Letters, 84(7), 1052-1054 (English) 2004. CODEN: APPLAB. ISSN: 0003-6951. Publisher: American Institute of Physics.

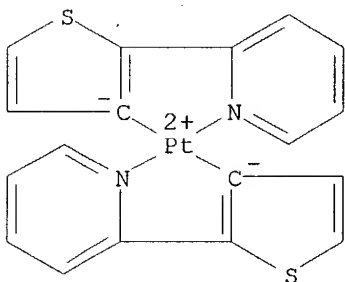
AB High efficiency electrophosphorescence (EPH) in organic **light-emitting** devices was achieved employing a cyclometalated Pt [Pt(II)]-complexes-doped blend of N,N'-diphenyl-N,N'-bis(3-methylphenyl)-1,1'-biphenyl-4,4'-diamine and bisphenol-A-polycarbonate as the emitting layer. Using bis-[2-(5-trimethylsilanyl-thiophen-2-yl)-pyridine] Pt(II) [Pt(thpy-SiMe3)] as a phosphorescent dopant, a maximum EPH external quantum efficiency of $11.5 \pm 0.5\%$ photons/carrier was achieved with a 3-fold lower roll-off factor at increasing c.d., compared with commonly used Pt-based dye 2,3,7,8,12,13,17,18-octaethyl-21H,23H-porphine Pt(II) (PtOEP). The emission spectrum of the device peaking at $\lambda_{\text{max}} = 590$ nm shifts the chromaticity coordinates toward the orange relative to the PtOEP-based devices.

CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

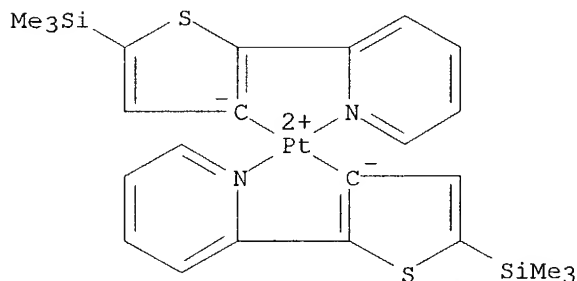
ST org electrophosphorescent **light emitting** diode LED
quantum efficiency; platinum complex phosphorescence electro LED

IT Phosphorescence
(electro-; highly efficient organic electrophosphorescent **light-emitting** diodes with a reduced quantum efficiency roll off at large current densities)

- IT **Electroluminescent devices**
(electrophosphorescent; highly efficient organic electrophosphorescent **light-emitting** diodes with a reduced quantum efficiency roll off at large current densities)
- IT 7440-70-2, Calcium, uses 50926-11-9, Indium tin oxide
RL: DEV (Device component use); USES (Uses)
(highly efficient organic electrophosphorescent **light-emitting** diodes with a reduced quantum efficiency roll off at large current densities)
- IT 15082-28-7 24936-68-3, properties 25037-45-0, Bisphenol-A-polycarbonate 31248-39-2 65181-78-4, N,N'-Diphenyl-N,N'-bis(3-methylphenyl)-1,1'-biphenyl-4,4'-diamine **100012-12-2**
109284-56-2
RL: DEV (Device component use); PRP (Properties); USES (Uses)
(highly efficient organic electrophosphorescent **light-emitting** diodes with a reduced quantum efficiency roll off at large current densities)
- IT **100012-12-2 109284-56-2**
RL: DEV (Device component use); PRP (Properties); USES (Uses)
(highly efficient organic electrophosphorescent **light-emitting** diodes with a reduced quantum efficiency roll off at large current densities)
- RN 100012-12-2 HCA
CN Platinum, bis[2-(2-pyridinyl- κ N)-3-thienyl- κ C]-, (SP-4-2)- (9CI) (CA INDEX NAME)



- RN 109284-56-2 HCA
CN Platinum, bis[3-(2-pyridinyl- κ N)-5-(trimethylsilyl)-3-thienyl- κ C]-, (SP-4-2)- (9CI) (CA INDEX NAME)

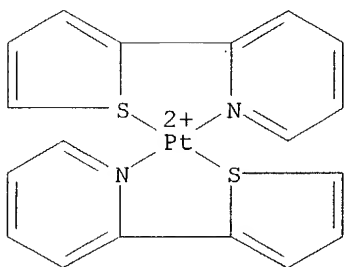


L51 ANSWER 2 OF 16 HCA COPYRIGHT 2004 ACS on STN
139:314258 Organic **electroluminescent** device with chromophore
dopants. Cocchi, Massimo; Di Marco, Piergiulio; Fattori, Valeria; Giro,

Gabriele; Kalinowski, Jan; Stampor, Waldemar; Virgili, Dalia (Consiglio Nazionale delle Ricerche, Italy). PCT Int. Appl. WO 2003083959 A1 20031009, 50 pp. DESIGNATED STATES: W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG, TR. (English). CODEN: PIXXD2. APPLICATION: WO 2003-IT187 20030328. PRIORITY: IT 2002-B0165 20020329.

- AB An organic **electroluminescent** device is described comprising an anode, a cathode, and an intermediate element, which is set between the anode and the cathode and contains hole-transporting organic material, electron-transporting **organic** material, and **luminophor** material; the electron-transporting organic material and the hole-transporting organic material being designed to form between them mol. complexes in an excited state (exciplexes or electroplexes); the luminophor material being designed to emit electromagnetic radiation and being supplied, in use, for transfer of energy from the mol. complexes in the excited state, wherein the luminophor material comprises at least one metallocyclic compound, which satisfies the structural formula (M)L L'L", wherein M = a transition metal, L, L' and L" = (each independently) a chelating ligand having electron-donor heteroatom. A method of fabricating the organic **electroluminescent** device is also described.
- IC ICM H01L051-30
ICS H01L051-20
- CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
Section cross-reference(s): 76, 78
- ST org **electroluminescent** device chromophore dopant
- IT Chromophores
Electroluminescent devices
Semiconductor device fabrication
(organic **electroluminescent** device with chromophore dopants)
- IT Polycarbonates, uses
RL: DEV (Device component use); USES (Uses)
(organic **electroluminescent** device with chromophore dopants)
- IT 852-38-0, PBD
RL: DEV (Device component use); USES (Uses)
(electron-transporting material; organic **electroluminescent** device with chromophore dopants)
- IT 124729-98-2
RL: DEV (Device component use); USES (Uses)
(hole-transporting material; organic **electroluminescent** device with chromophore dopants)
- IT 13978-85-3 54891-36-0 **138736-22-8** 227464-62-2
RL: DEV (Device component use); USES (Uses)
(**luminophor**; organic **electroluminescent** device with chromophore dopants)
- IT 94928-86-6
RL: DEV (Device component use); MOA (Modifier or additive use); USES (Uses)
(**luminophor**; organic **electroluminescent** device with chromophore dopants)
- IT 517-51-1, Rubrene 7440-22-4, Silver, uses 7440-70-2, Calcium, uses

50926-11-9, ITO
RL: DEV (Device component use); USES (Uses)
(organic **electroluminescent** device with chromophore dopants)
IT 2085-33-8
RL: DEV (Device component use); MOA (Modifier or additive use); USES
(Uses)
(organic **electroluminescent** device with chromophore dopants)
IT 138736-22-8
RL: DEV (Device component use); USES (Uses)
(**luminophor**; organic **electroluminescent**
device with chromophore dopants)
RN 138736-22-8 HCA
CN Platinum(2+), bis[2-(2-thienyl- κ S)pyridine- κ N]- (9CI) (CA
INDEX NAME)



L51 ANSWER 3 OF 16 HCA COPYRIGHT 2004 ACS on STN

138:17951 Organometallic compounds and emission-shifting organic electrophosphorescence. Lamansky, Sergey; Thompson, Mark E.; Adamovich, Vadim; Djurovich, Peter I.; Adachi, Chihaya; Baldo, Marc A.; Forrest, Stephen R.; Kwong, Raymond (Trustees of Princeton University, USA). U.S. Pat. Appl. Publ. US 2002182441 A1 20021205, 87 pp., Cont.-in-part of U.S. Ser. No. 637,766. (English). CODEN: USXXCO. APPLICATION: US 2001-978455 20011016. PRIORITY: US 2000-637766 20000811; US 2001-PV283814 20010413.

AB Organic **light-emitting** devices including an emissive layer comprising an organometallic compound are described in which the organometallic compound comprises a heavy transition metal (e.g., Os, Ir, Pt, or Au) that produces an efficient phosphorescent emission at room temperature from a mixture of metal-to-ligand charge transfer and π - π^* ligand states; ≥ 1 mono-anionic bidentate carbon-coordination ligand bound to the heavy transition metal, the ligand(s) being substituted with an electron-donating substituent and/or an electron-withdrawing substituent which shifts the emission, relative to the unsubstituted ligand, to either the blue, green, or red region of the visible spectrum; and ≥ 1 non-monoanionic bidentate carbon-coordination ligand bound to the heavy transition metal which ligand(s) causes the emission to have a well defined vibronic structure. The organometallic compds. are also claimed.

IC ICM H05B033-14

ICS C09K011-06

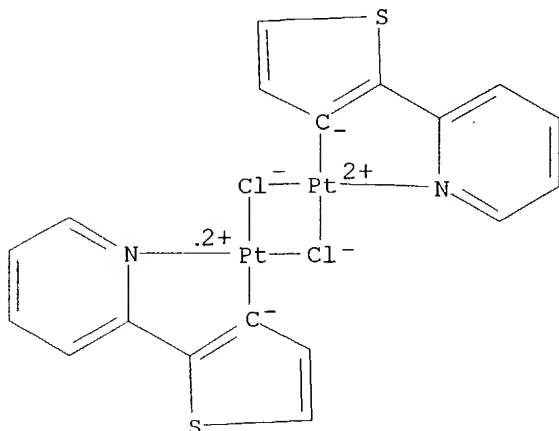
NCL 428690000; 428917000; 313504000; 313506000; 257102000; 257103000; 252301160; 544225000; 546002000; 548101000

CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

Section cross-reference(s): 76, 78

ST org **light emitting** device **emission** shifting

organometallic complex
IT **Luminescent** substances
Phosphorescent substances
(**organic light-emitting** devices using
emission shifting organometallic complexes and the complexes)
IT **Electroluminescent** devices
(organic; **organic light-emitting** devices using emission
shifting organometallic complexes and the complexes)
IT 147-14-8, Copper phthalocyanine 2085-33-8, Tris(8-
hydroxyquinolinato)aluminum 4733-39-5, Bathocuproine 31248-39-2
50926-11-9, Indium tin oxide 58328-31-7, 4,4'-N,N'-Dicarbazolylbiphenyl
65181-78-4, TPD 94928-86-6, fac-Tris(2-phenylpyridine)iridium
123847-85-8, 4,4'-Bis[N-(1-naphthyl)-N-phenylamino]biphenyl 146162-54-1
RL: DEV (Device component use); USES (Uses)
(**organic light-emitting** devices using emission
shifting organometallic complexes and the complexes)
IT 40243-13-8P 345659-08-7P 376367-93-0P 376367-95-2P 391665-84-2P
400653-85-2P 400653-86-3P 400653-87-4P 400653-88-5P 400653-89-6P
400653-90-9P 400653-91-0P 400653-92-1P 400653-93-2P 400653-94-3P
400653-95-4P 400653-96-5P 400653-97-6P 400653-98-7P 400654-01-5P
400654-02-6P 400654-04-8P 400654-05-9P 400654-06-0P 400654-08-2P
400654-10-6P 400654-12-8P 400654-13-9P
RL: DEV (Device component use); MOA (Modifier or additive use); SPN
(Synthetic preparation); PREP (Preparation); USES (Uses)
(**organic light-emitting** devices using emission
shifting organometallic complexes and the complexes)
IT 88821-71-0 125051-45-8 400654-15-1 400655-42-7
RL: PRP (Properties)
(**organic light-emitting** devices using emission
shifting organometallic complexes and the complexes)
IT 56-40-6, Glycine, reactions 98-97-5, Pyrazinecarboxylic acid 98-98-6,
Picolinic acid 109-04-6, 2-Bromopyridine 110-86-1, Pyridine, reactions
123-54-6, 2,4-Pentadione, reactions 151-50-8, Potassium cyanide
366-18-7, 2,2'-Bipyridine 540-72-7, Sodium thiocyanide 603-35-0,
Triphenylphosphine, reactions 939-23-1, 4-Phenylpyridine 1663-45-2,
1,2-Bis(diphenylphosphino)ethane 7188-38-7, tert-Butylisocyanide
10025-83-9, Iridium trichloride 15635-87-7, Iridium
tris(acetylacetonate) 18583-60-3, Potassium tris(pyrazolyl)borate
40243-18-3 99646-28-3 **125081-56-3** 144025-03-6,
2,4-Difluorophenylboronic acid 155475-93-7 158333-96-1 400653-99-8
400654-03-7 400654-07-1 400654-09-3 400654-11-7 400654-14-0
RL: RCT (Reactant); RACT (Reactant or reagent)
(**organic light-emitting** devices using emission
shifting organometallic complexes and the complexes)
IT 391604-55-0P 391611-77-1P 400654-00-4P
RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT
(Reactant or reagent)
(**organic light-emitting** devices using emission
shifting organometallic complexes and the complexes)
IT **125081-56-3**
RL: RCT (Reactant); RACT (Reactant or reagent)
(**organic light-emitting** devices using emission
shifting organometallic complexes and the complexes)
RN 125081-56-3 HCA
CN Platinum, di- μ -chlorobis[2-(2-pyridinyl- κ N)-3-thienyl- κ C]di-
(9CI) (CA INDEX NAME)

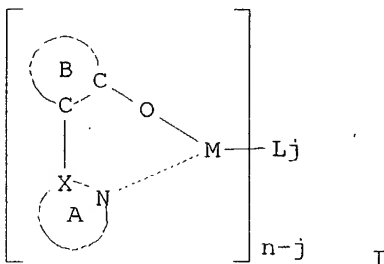


L51 ANSWER 4 OF 16 HCA COPYRIGHT 2004 ACS on STN

137:317660 Organic **electroluminescent** device with metal complex.

Sato, Hideki; Sato, Yoshiharu (Mitsubishi Chemical Corp., Japan). Jpn. Kokai Tokkyo Koho JP 2002305083 A2 20021018, 21 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 2001-106022 20010404.

GI



AB The invention refers to an organic **electroluminescent** device comprising a complex with ≥ 1 metal(s) from Group 7 - 11 of the Period Table, and a metal complex I [M = metal from group 1, 2, 3, 12 or 13 of the Period Table; n = metal valence; L = ligands; j = 0, 1; X = C or N; ring A = N-containing heterocyclyl; ring B = optional substituted aromatic hydrocarbyl or aromatic heterocyclyl] in its luminescent layer.

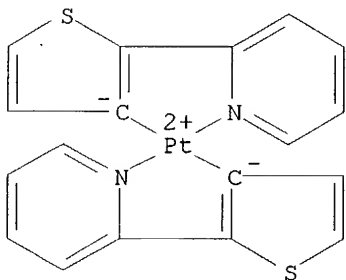
IC ICM H05B033-14

ICS C07D213-06; C07D213-26; C07D215-06; C07D221-10; C07D233-64; C07D235-12; C07D249-08; C07D249-20; C07D261-08; C07D263-32; C07D263-56; C07D275-02; C07D277-10; C07D277-66; C07D401-04; C07D405-04; C07D409-04; C07D471-04; C07D487-22

CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

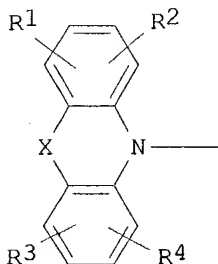
ST **electroluminescent** device luminescent zinc platinum iridium complex

IT **Electroluminescent** devices
 Luminescent substances
 (metal complex of)
 IT 31248-39-2 58280-31-2 94928-86-6 **100012-12-2** 157077-25-3
 208187-79-5
 RL: DEV (Device component use); USES (Uses)
 (organic **electroluminescent** device containing)
 IT **100012-12-2**
 RL: DEV (Device component use); USES (Uses)
 (organic **electroluminescent** device containing).
 RN 100012-12-2 HCA
 CN Platinum, bis[2-(2-pyridinyl-κN)-3-thienyl-κC]-, (SP-4-2)-
 (9CI) (CA INDEX NAME)



L51 ANSWER 5 OF 16 HCA COPYRIGHT 2004 ACS on STN
 137:176902 Organic **electroluminescent** element. Sato, Yoshiharu;
 Sato, Hideki; Ichinosawa, Akiko; Fugono, Masayo (Mitsubishi Chemical
 Corp., Japan). Jpn. Kokai Tokkyo Koho JP 2002231453 A2 20020816, 23 pp.
 (Japanese). CODEN: JKXXAF. APPLICATION: JP 2001-112894 20010411.
 PRIORITY: JP 2000-364309 20001130.

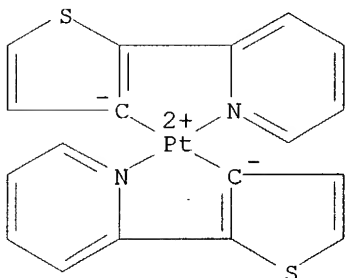
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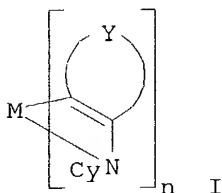
AB The invention refers to an **electroluminescent** element comprising
 I [R1-4 = H or substituent, and adjacent groups may join to form rings; X
 = O or S] or a derivative and a complex with at least one metal in the period
 groups 7 to 10 in the luminescent layer.
 IC ICM H05B033-14
 ICS C09K011-06; H05B033-22
 CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related

Properties)
 ST **electroluminescent** material device display metal complex
 IT **Electroluminescent** devices
 (displays; organic **electroluminescent** element)
 IT **Luminescent** screens
 Luminescent substances
 (**electroluminescent**; **organic**
 electroluminescent element)
 IT **Electroluminescent** devices
 Optical imaging devices
 (orgnamic **electroluminescent** element)
 IT 96817-82-2 **100012-12-2**
 RL: DEV (Device component use); USES (Uses)
 (orgnamic **electroluminescent** element)
 IT **100012-12-2**
 RL: DEV (Device component use); USES (Uses)
 (orgnamic **electroluminescent** element)
 RN 100012-12-2 HCA
 CN Platinum, bis[2-(2-pyridinyl-κN)-3-thienyl-κC]-, (SP-4-2)-
 (9CI) (CA INDEX NAME)



L51 ANSWER 6 OF 16 HCA COPYRIGHT 2004 ACS on STN
 137:116745 Metal coordination compound, luminescence device and display
 apparatus. Takiguchi, Takao; Okada, Shinjiro; Tsuboyama, Akira; Noguchi,
 Koji; Moriyama, Takashi; Kamatani, Jun; Furugori, Manabu (Canon Kabushiki
 Kaisha, Japan). U.S. Pat. Appl. Publ. US 2002094453 A1 20020718, 16 pp.
 (English). CODEN: USXXCO. APPLICATION: US 2001-995610 20011129.
 PRIORITY: JP 2000-362150 20001129; JP 2001-344550 20011109.

GI



AB Metal coordination compds. suitable as an organic material for a luminescent
 device are described by the general formula I (M = Ir, Pt, Rh, or Pd; n =

2 or 3; Y = C2-6 alkylene group optionally with ≥ 1 nonadjacent methylene groups which can be replaced with -O-, -S- or -CO- and with hydrogen atoms which can be replaced by (un)branched C1-10 (fluoro)alkyl groups; and CyN = a cyclic group containing nitrogen atom connected to M which may have substituents selected from halogen atoms; nitro groups; Ph groups; C1-8 trialkylsilyl groups; and (un)branched C1-20 alkyl groups which may include ≥ 1 nonadjacent methylene groups which can be replaced by -O-, -S-, -CO-, -CO-O-, -O-CO-, -CH:CH- or -C.tplbond.C- which may include hydrogen atoms which can be replaced with fluorine atoms). Elec. devices, especially **electroluminescent** devices, employing the materials, and displays employing the **electroluminescent** devices, are also described.

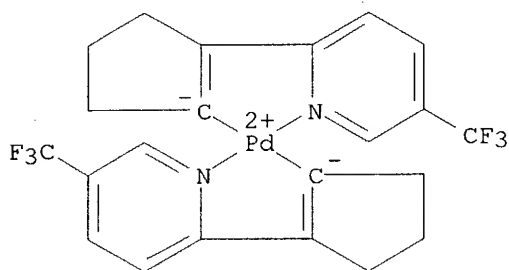
- IC ICM H05B033-14
ICS C07D263-52; C07D213-02; C07D215-00; C07D231-54; C07D233-54;
C07D235-02; C07D277-60; C09K011-06
- NCL 428690000
- CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
Section cross-reference(s): 74, 76, 78
- ST metal coordination compd **electroluminescent** device display
- IT **Electroluminescent** devices
(displays; metal coordination compds. and **electroluminescent** devices and displays using them)
- IT Luminescent screens
Luminescent substances
(**electroluminescent**; metal coordination compds. and **electroluminescent** devices and displays using them)
- IT **Electroluminescent** devices
(metal coordination compds. and **electroluminescent** devices and displays using them)
- IT 2085-33-8, Tris(8-hydroxyquinolinato)aluminum 7429-90-5, Aluminum, uses 12615-41-7 12723-72-7 50926-11-9, ITO 123847-85-8, α -NPD 442852-38-2 442852-39-3 442852-40-6 442852-41-7 442852-42-8 442852-43-9 **442852-44-0** 442905-22-8 442905-23-9 **442905-24-0** 442905-25-1
RL: DEV (Device component use); USES (Uses)
(metal coordination compds. and **electroluminescent** devices and displays using them)
- IT 58328-31-7, 4,4'-N,N'-Dicarbazolylbiphenyl
RL: DEV (Device component use); MOA (Modifier or additive use); USES (Uses)
(metal coordination compds. and **electroluminescent** devices and displays using them)
- IT 442852-37-1P
RL: DEV (Device component use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
(metal coordination compds. and **electroluminescent** devices and displays using them)
- IT 98-88-4, Benzoyl chloride 123-54-6, Acetylacetone, reactions 694-59-7 936-52-7 10025-83-9, Iridium trichloride
RL: RCT (Reactant); RACT (Reactant or reagent)
(metal coordination compds. and **electroluminescent** devices and displays using them)
- IT 28885-25-8P 56698-38-5P 442686-42-2P 442852-35-9P 442852-36-0P
RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)
(metal coordination compds. and **electroluminescent** devices and displays using them)

IT 442852-44-0 442905-24-0

RL: DEV (Device component use); USES (Uses)
 (metal coordination compds. and **electroluminescent** devices
 and displays using them)

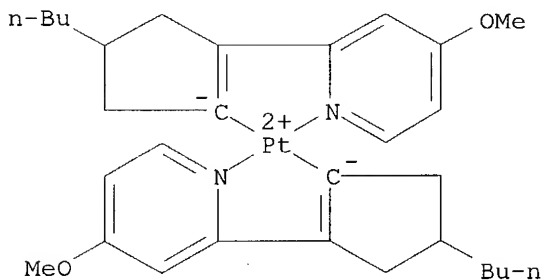
RN 442852-44-0 HCA

CN Palladium, bis[2-[5-(trifluoromethyl)-2-pyridinyl-κN]-1-cyclopenten-
 1-yl-κC]- (9CI) (CA INDEX NAME)



RN 442905-24-0 HCA

CN Platinum, bis[4-butyl-2-(4-methoxy-2-pyridinyl-κN)-3(or
 5)-oxo-1-cyclopenten-1-yl-κC]- (9CI) (CA INDEX NAME)

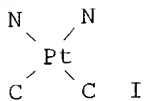


2 (D2=O)

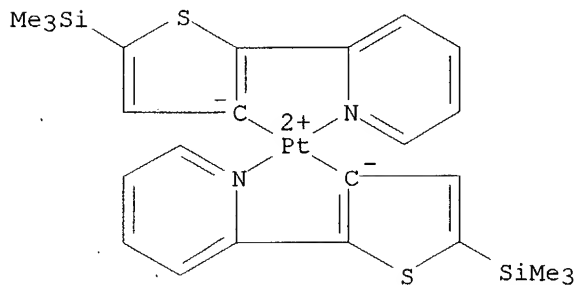
L51 ANSWER 7 OF 16 HCA COPYRIGHT 2004 ACS on STN

136:286689 **Electroluminescent** device comprising platinum
 coordination compound. Tsuboyama, Akira; Mizutani, Hidemasa; Okada,
 Shinjiro; Takiguchi, Takao; Moriyama, Takashi; Kamatani, Jun (Canon
 Kabushiki Kaisha, Japan). Eur. Pat. Appl. EP 1191614 A2 20020327, 27 pp.
 DESIGNATED STATES: R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL,
 SE, MC, PT, IE, SI, LT, LV, FI, RO. (English). CODEN: EPXXDW.
 APPLICATION: EP 2001-122939 20010925. PRIORITY: JP 2000-292491 20000926;
 JP 2001-284601 20010919.

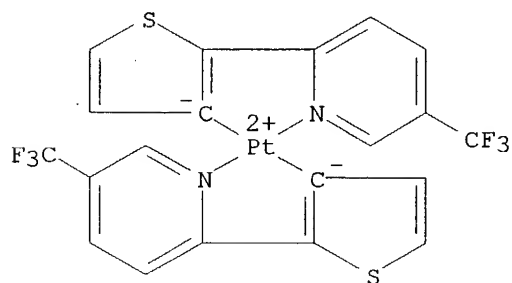
GI



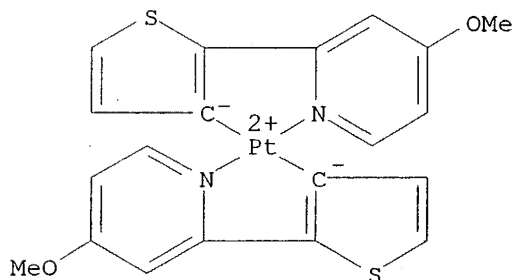
- AB An **electroluminescent** device is principally constituted by a pair of electrodes and an organic compound layer disposed between. The organic compound layer contains a metal coordination compound characterized by having a partial structure represented by the formula I (N, C represents an atom constituting a cyclic group and as further defined in the claims). The object of the present invention is to provide a luminescence device capable of providing a high-efficiency luminescent state at a high brightness (or luminance) for a long period while minimizing the deterioration in luminescence in energized state.
- IC ICM H01L051-20
ICS H05B033-14; C09K011-06
- CC 74-13 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)
Section cross-reference(s): 73
- ST **electroluminescent** device platinum coordination compd
- IT **Electroluminescent** devices
Luminescence, **electroluminescence**
(**electroluminescent** device comprising platinum coordination compound)
- IT Phosphorescence
(**electroluminescent** device comprising platinum coordination compound in relation to)
- IT 88821-71-OP **109284-56-2P** 132692-93-4P **405505-98-8P**
405505-99-9P 405506-00-5P **405506-01-6P**
405506-02-7P
RL: DEV (Device component use); PNU (Preparation, unclassified); PRP (Properties); PREP (Preparation); USES (Uses)
(**electroluminescent** device comprising platinum coordination compound)
- IT **100012-12-2P** 110077-26-4P 180971-61-3P
RL: DEV (Device component use); PRP (Properties); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
(**electroluminescent** device comprising platinum coordination compound)
- IT **109284-56-2P** **405505-98-8P** **405505-99-9P**
405506-01-6P **405506-02-7P**
RL: DEV (Device component use); PNU (Preparation, unclassified); PRP (Properties); PREP (Preparation); USES (Uses)
(**electroluminescent** device comprising platinum coordination compound)
- RN 109284-56-2 HCA
- CN Platinum, bis[3-(2-pyridinyl-κN)-5-(trimethylsilyl)-3-thienyl-κC]-, (SP-4-2)-(9CI) (CA INDEX NAME)



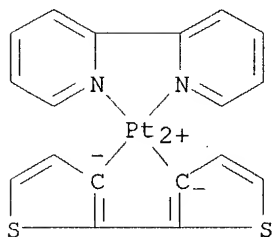
RN 405505-98-8 HCA
CN Platinum, bis[2-[5-(trifluoromethyl)-2-pyridinyl- κ N]-3-thienyl- κ C]-, (SP-4-2)- (9CI) (CA INDEX NAME)



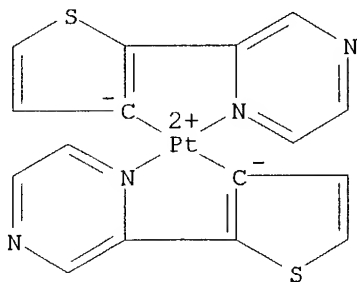
RN 405505-99-9 HCA
CN Platinum, bis[2-(4-methoxy-2-pyridinyl- κ N)-3-thienyl- κ C]-, (SP-4-2)- (9CI) (CA INDEX NAME)



RN 405506-01-6 HCA
CN Platinum, (2,2'-bipyridine- κ N1, κ N1') [2,2'-bithiophene]-3,3'-diyl-, (SP-4-2)- (9CI) (CA INDEX NAME)



RN 405506-02-7 HCA
CN Platinum, bis[2-(pyrazinyl- κ N1)-3-thienyl- κ C]-, (SP-4-2)- (9CI) (CA INDEX NAME)

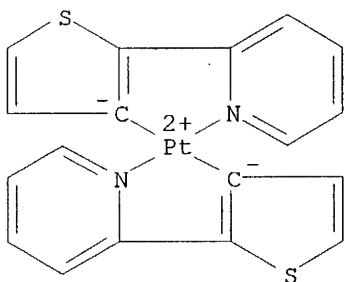


IT 100012-12-2P

RL: DEV (Device component use); PRP (Properties); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
 (electroluminescent device comprising platinum coordination compound)

RN 100012-12-2 HCA

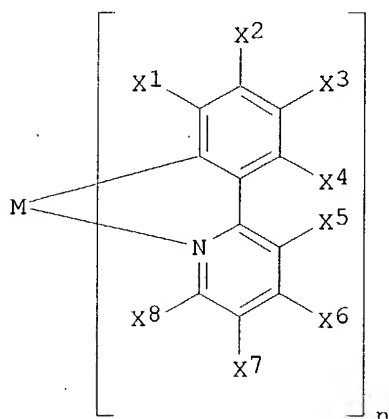
CN Platinum, bis[2-(2-pyridinyl-κN)-3-thienyl-κC]-, (SP-4-2)-
 (9CI) (CA INDEX NAME)



L51 ANSWER 8 OF 16 HCA COPYRIGHT 2004 ACS on STN

136:286688 **Electroluminescent** display device with high brightness and efficiency comprising metal coordination compound. Takiguchi, Takao; Mizutani, Hidemasa; Okada, Shinjiro; Tsuboyama, Akira; Miura, Seishi; Moriyama, Takashi; Igawa, Satoshi; Kamatani, Jun; Furugori, Manabu (Canon Kabushiki Kaisha, Japan). Eur. Pat. Appl. EP 1191613 A2 20020327, 49 pp. DESIGNATED STATES: R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO. (English). CODEN: EPXXDW. APPLICATION: EP 2001-122938 20010925. PRIORITY: JP 2000-292492 20000926; JP 2000-292493 20000926; JP 2000-358741 20001127; JP 2000-358742 20001127; JP 2001-255537 20010827; JP 2001-284599 20010919.

GI



I

AB A luminescence device is principally constituted by a pair of electrodes and an organic compound layer disposed between. The layer contains a metal coordination compound represented by the formula I (M = Ir, Rh, Pd; n = 2, 3; X1-X8 = halogen, nitro, trifluoromethyl, C1-8-trialkylsilyl, C2-20-alkyl capable of including one or two non-neighboring methylene groups which can be replaced with -O-, -S-, -CO-, -CO-O-, -O-CO-, -CH=CH-, -C.tplbond.C- and capable of including hydrogen atom which can be replaced with fluorine atom; with the proviso that at least one of X1 to X8 is a substituent other than hydrogen atom, and X2 and X3 cannot be fluorine atom at the same time). The object of the present invention is to provide an **electroluminescence** device capable of providing a high-efficiency luminescent state at a high brightness (or luminance) for a long period while minimizing the deterioration in luminescence in energized state.

IC ICM H01L051-20

ICS H05B033-14; C09K011-06

CC 74-13 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)

Section cross-reference(s): 73

ST **electroluminescent** display device iridium palladium rhodium coordination compd

IT **Electroluminescent** devices

Luminescence, **electroluminescence**

(**electroluminescence** display device with high brightness and efficiency comprising metal coordination compound)

IT Phosphorescence

(**electroluminescence** display device with high brightness and efficiency comprising metal coordination compound in relation to)

IT 405890-12-2 405890-13-3 405890-14-4 405890-15-5 405890-16-6

405890-17-7 405890-18-8 405890-19-9 405890-20-2 405890-23-5

405890-26-8 405890-27-9 405890-28-0 405890-29-1 405890-30-4

405890-31-5 405890-32-6 **405890-33-7 405890-34-8**

405890-35-9 405890-36-0 405890-37-1

RL: DEV (Device component use); PRP (Properties); USES (Uses)

(**electroluminescence** display device with high brightness and efficiency comprising metal coordination compound)

IT 387859-70-3P 405890-11-1P 405890-24-6P 405890-25-7P 405927-91-5P

405927-92-6P

RL: DEV (Device component use); PRP (Properties); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)

(electroluminescence display device with high brightness and efficiency comprising metal coordination compound)

IT 405890-21-3P 405890-22-4P

RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)

(electroluminescence display device with high brightness and efficiency comprising metal coordination compound)

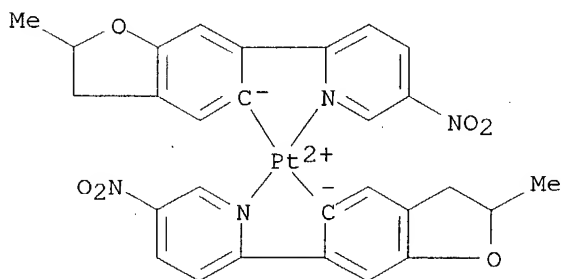
IT 405890-33-7 405890-34-8

RL: DEV (Device component use); PRP (Properties); USES (Uses)

(electroluminescence display device with high brightness and efficiency comprising metal coordination compound)

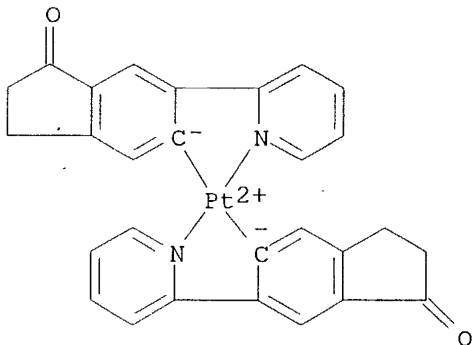
RN 405890-33-7 HCA

CN Platinum, bis[2,3-dihydro-2-methyl-6-(5-nitro-2-pyridinyl-κN)-5-benzofuranyl-κC]- (9CI) (CA INDEX NAME)



RN 405890-34-8 HCA

CN Platinum, bis[2,3-dihydro-1-oxo-6-(2-pyridinyl-κN)-1H-inden-5-yl-κC]- (9CI) (CA INDEX NAME)



L51 ANSWER 9 OF 16 HCA COPYRIGHT 2004 ACS on STN

136:254380 Organometallic complexes as phosphorescent emitters in organic LEDs. Thompson, Mark E.; Djurovich, Peter; Lamansky, Sergey; Murphy, Drew; Kwong, Raymond; Abdel-Razzaq, Feras; Forrest, Stephen R.; Baldo, Marc A.; Burrows, Paul E. (USA). U.S. Pat. Appl. Publ. US 20020034656 A1 20020321, 77 pp., Cont.-in-part of U. S. Ser. No. 274,609, abandoned. (English). CODEN: USXXCO. APPLICATION: US 2001-883734 20010618. PRIORITY: US 1998-153144 19980914; US 1999-274609 19990323; US 1999-311126 19990513; US 1999-452346 19991201.

AB Emissive layers of organic **light-emitting** devices are

described which comprise a phosphorescent organometallic compound for enhancing the quantum efficiency of the organic **light-emitting** device. Preferably the emissive mol. is selected from the group of phosphorescent organometallic complexes, including cyclometallated platinum, iridium, and osmium complexes. The organic **light-emitting** devices optionally contain an exciton blocking layer. In particular, organic **light-emitting** devices with an emitter layer comprising organometallic complexes of transition metals of formula L_2MX , wherein L and X are distinct bidentate ligands and M is a metal which forms octahedral complexes, are described. A method of making a composition of the formula L_2MX is described which entails combining a bridged dimer of formula $L_2M(\mu-Cl)_2ML_2$ with a Bronsted acid XH to make the desired organometallic complex. Display devices incorporating the **light-emitting** devices are also described.

- IC ICM H05B033-14
ICS C09K011-06
- NCL 428690000
- CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
Section cross-reference(s): 74, 76, 78
- ST organometallic compd phosphorescent **emitter** org **light emitting** device
- IT **Electroluminescent** devices
(organic; organometallic complexes and their preparation and organic **light-emitting** devices using them as phosphorescent emitters)
- IT Phosphorescent substances
(organometallic complexes and their preparation and organic **light-emitting** devices using them as phosphorescent emitters)
- IT 2085-33-8, Tris(8-hydroxyquinolinato)aluminum 4733-39-5,
2,9-Dimethyl-4,7-diphenyl-1,10-phenanthroline 7440-04-2D, Osmium,
compds. with organic ligands 9003-53-6, Polystyrene 25067-59-8,
Polyvinylcarbazole 57102-62-2D, derivs. 58328-31-7 58328-31-7D,
derivs. 88821-71-0 94928-86-6, fac-Tris(2-phenylpyridine)iridium
123847-85-8, 4,4'-Bis[N-(1-naphthyl)-N-phenylamino]biphenyl 180971-61-3
212385-75-6D, derivs. 344406-74-2D, derivs.
RL: DEV (Device component use); USES (Uses)
(organometallic complexes and their preparation and organic **light-emitting** devices using them as phosphorescent emitters)
- IT 337526-86-0P 337526-88-2P 337526-89-3P 337526-98-4P 343978-86-9P
343978-88-1P 343978-92-7P 343978-96-1P 343978-99-4P 344426-19-3P
RL: DEV (Device component use); IMF (Industrial manufacture); PREP
(Preparation); USES (Uses)
(organometallic complexes and their preparation and organic **light-emitting** devices using them as phosphorescent emitters)
- IT 110077-26-4P **138736-22-8P** 337526-85-9P 337526-87-1P
337526-91-7P 343978-75-6P 343978-76-7P 343978-77-8P 343978-78-9P
343978-79-0P
RL: DEV (Device component use); SPN (Synthetic preparation); PREP
(Preparation); USES (Uses)
(organometallic complexes and their preparation and organic **light-emitting** devices using them as phosphorescent emitters)
- IT 86-55-5, 1-Naphthoic acid 91-22-5, Quinoline, reactions 95-55-6,
2-Aminophenol 98-98-6, Picolinic acid 108-86-1, Bromobenzene,
reactions 110-02-1, Thiophene 110-86-1, Pyridine, reactions
123-54-6, Acetylacetone, reactions 148-24-3, 8-Hydroxyquinoline,
reactions 302-01-2, Hydrazine, reactions 352-93-2, Diethyl sulfide
372-48-5, 2-Fluoropyridine 602-09-5, 2,2'-Dihydroxy-1,1'-binaphthyl

615-36-1 1126-00-7, 1-Phenylpyrazole 3117-65-5 4467-06-5,
 2-(p-Tolyl)pyridine 7726-95-6, Bromine, reactions 7758-02-3, Potassium
 bromide, reactions 10025-83-9, Iridium trichloride 10025-99-7,
 Potassium tetrachloroplatinate 15635-87-7 38215-36-0 53698-49-0,
 3-Methoxy-2-phenylpyridine 343978-74-5

RL: RCT (Reactant); RACT (Reactant or reagent)

(organometallic complexes and their preparation and organic **light-emitting** devices using them as phosphorescent emitters)

IT 1008-89-5P, 2-Phenylpyridine 1454-80-4P, 2,2'-Diaminobiphenyl
 2436-96-6P, 2,2'-Dinitrobiphenyl 3164-18-9P, 2-(1-Naphthyl)benzoxazole
 3319-99-1P, 2-(2-Thienyl)pyridine 13029-09-9P, 2,2'-Dibromobiphenyl
 34243-33-9P 57175-14-1P 74866-28-7P, 2,2'-Dibromo-1,1'-binaphthyl
 109306-86-7P 116563-45-2P 343978-82-5P 343978-90-5P

RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT
 (Reactant or reagent)

(organometallic complexes and their preparation and organic **light-emitting** devices using them as phosphorescent emitters)

IT 15337-84-5P 15442-57-6P, cis-Dichlorobis-(diethyl sulfide)platinum
 128025-34-3P

RL: SPN (Synthetic preparation); PREP (Preparation)

(organometallic complexes and their preparation and organic **light-emitting** devices using them as phosphorescent emitters)

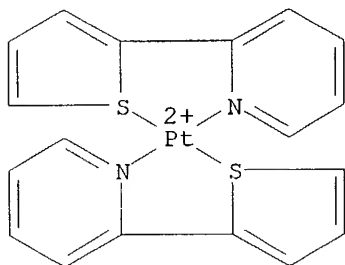
IT 138736-22-8P

RL: DEV (Device component use); SPN (Synthetic preparation); PREP
 (Preparation); USES (Uses)

(organometallic complexes and their preparation and organic **light-emitting** devices using them as phosphorescent emitters)

RN 138736-22-8 HCA

CN Platinum(2+), bis[2-(2-thienyl-κS)pyridine-κN]- (9CI) (CA
 INDEX NAME)



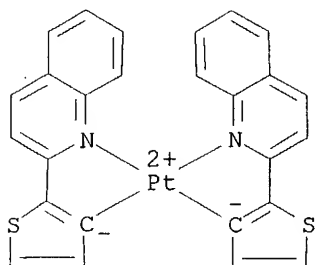
IT 128025-34-3P

RL: SPN (Synthetic preparation); PREP (Preparation)

(organometallic complexes and their preparation and organic **light-emitting** devices using them as phosphorescent emitters)

RN 128025-34-3 HCA

CN Platinum, bis[2-(2-quinolinyl-κN)-3-thienyl-κC]-, (SP-4-2)-
 (9CI) (CA INDEX NAME)



L51 ANSWER 10 OF 16 HCA COPYRIGHT 2004 ACS on STN
 136:191506 Organometallic compounds and emission-shifting organic electrophosphorescence. Lamansky, Sergey; Thompson, Mark E.; Adamovich, Vadim; Djurovich, Peter L.; Adachi, Chihaya; Baldo, Marc A.; Forrest, Stephen R.; Kwong, Raymond C. (The Trustees of Princeton University, USA; The University of Southern California; Universal Display Corporation). PCT Int. Appl. WO 2002015645 A1 20020221, 155 pp. DESIGNATED STATES: W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG, TR. (English). CODEN: PIXXD2. APPLICATION: WO 2001-US25108 20010810. PRIORITY: US 2000-637766 20000811; US 2001-PV283814 20010413.

AB Organic **light-emitting** devices including an emissive layer comprising an organometallic compound are described in which the organometallic compound comprises a heavy transition metal (e.g., Os, Ir, Pt, or Au) that produces an efficient phosphorescent emission at room temperature from a mixture of metal-to-ligand charge transfer and π - π^* ligand states; ≥ 1 mono-anionic bidentate carbon-coordination ligand bound to the heavy transition metal, the ligand(s) being substituted with an electron-donating substituent and/or an electron-withdrawing substituent which shifts the emission, relative to the unsubstituted ligand, to either the blue, green, or red region of the visible spectrum; and ≥ 1 non-monoanionic bidentate carbon-coordination ligand bound to the heavy transition metal which ligand(s) causes the emission to have a well defined vibronic structure. The organometallic compds. are also claimed.

IC ICM H05B033-14

ICS C09K011-06; C07D213-02; C07D231-10; C07D241-10; C07D333-52

CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

Section cross-reference(s): 76, 78

ST org **light emitting** device **emission** shifting organometallic complex

IT **Luminescent** substances
 Phosphorescent substances

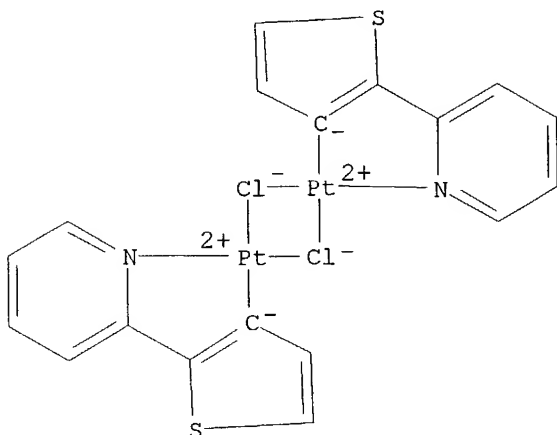
(**organic light-emitting** devices using emission shifting organometallic complexes and the complexes)

IT **Electroluminescent** devices

(organic; organic **light-emitting** devices using emission shifting organometallic complexes and the complexes)

IT 147-14-8, Copper phthalocyanine 2085-33-8, Tris(8-

hydroxyquinolinato)aluminum 4733-39-5, Bathocuproine 31248-39-2
 50926-11-9, Indium tin oxide 58328-31-7, 4,4'-N,N'-Dicarbazolylbiphenyl
 65181-78-4, TPD 94928-86-6, fac-Tris(2-phenylpyridine)iridium
 123847-85-8, 4,4'-Bis[N-(1-naphthyl)-N-phenylamino]biphenyl 146162-54-1
 RL: DEV (Device component use); USES (Uses)
 (organic **light-emitting** devices using emission
 shifting organometallic complexes and the complexes)
 IT 40243-13-8P 345659-08-7P 376367-93-0P 376367-95-2P 391665-84-2P
 400653-85-2P 400653-86-3P 400653-87-4P 400653-88-5P 400653-89-6P
 400653-90-9P 400653-91-0P 400653-92-1P 400653-93-2P 400653-94-3P
 400653-95-4P 400653-96-5P 400653-97-6P 400653-98-7P 400654-01-5P
 400654-02-6P 400654-04-8P 400654-05-9P 400654-06-0P 400654-08-2P
 400654-10-6P 400654-12-8P 400654-13-9P
 RL: DEV (Device component use); MOA (Modifier or additive use); SPN
 (Synthetic preparation); PREP (Preparation); USES (Uses)
 (organic **light-emitting** devices using emission
 shifting organometallic complexes and the complexes)
 IT 88821-71-0 125051-45-8 400654-15-1 400655-42-7
 RL: PRP (Properties)
 (organic **light-emitting** devices using emission
 shifting organometallic complexes and the complexes)
 IT 56-40-6, Glycine, reactions 98-97-5, Pyrazinecarboxylic acid 98-98-6,
 Picolinic acid 109-04-6, 2-Bromopyridine 110-86-1, Pyridine, reactions
 123-54-6, 2,4-Pentadione, reactions 151-50-8, Potassium cyanide
 366-18-7, 2,2'-Bipyridine 540-72-7, Sodium thiocyanide 603-35-0,
 Triphenylphosphine, reactions 939-23-1, 4-Phenylpyridine 1663-45-2,
 1,2-Bis(diphenylphosphino)ethane 7188-38-7, tert-Butylisocyanide
 10025-83-9, Iridium trichloride 15635-87-7, Iridium
 tris(acetylacetonate) 18583-60-3, Potassium tris(pyrazolyl)borate
 40243-18-3 99646-28-3 **125081-56-3** 144025-03-6,
 2,4-Difluorophenylboronic acid 155475-93-7 158333-96-1 400653-99-8
 400654-03-7 400654-07-1 400654-09-3 400654-11-7 400654-14-0
 RL: RCT (Reactant); RACT (Reactant or reagent)
 (organic **light-emitting** devices using emission
 shifting organometallic complexes and the complexes)
 IT 391604-55-0P 391611-77-1P 400654-00-4P
 RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT
 (Reactant or reagent)
 (organic **light-emitting** devices using emission
 shifting organometallic complexes and the complexes)
 IT **125081-56-3**
 RL: RCT (Reactant); RACT (Reactant or reagent)
 (organic **light-emitting** devices using emission
 shifting organometallic complexes and the complexes)
 RN 125081-56-3 HCA
 CN Platinum, di- μ -chlorobis[2-(2-pyridinyl- κ N)-3-thienyl- κ C]di-
 (9CI) (CA INDEX NAME)



L51 ANSWER 11 OF 16 HCA COPYRIGHT 2004 ACS on STN

136:158400 Molecularly doped polymer **light emitting** diodes

utilizing phosphorescent Pt(II) and Ir(III) dopants. Lamansky, Sergey; Kwong, Raymond C.; Nugent, Matthew; Djurovich, Peter I.; Thompson, Mark E. (Department of Chemistry, University of Southern California, Los Angeles, CA, 90089, USA). *Organic Electronics*, 2(1), 53-62 (English) 2001. CODEN: OERLAU. ISSN: 1566-1199. Publisher: Elsevier Science B.V..

AB Mol. phosphorescent dyes were combined with polymers to evaluate the systems for use in organic **light emitting** diodes (OLED). The polymer is poly(N-vinylcarbazole) (PVK) and the dyes are cis-bis[2-(2-thienyl)pyridine-N,C3] platinum(II) (Pt(thpy)2) and platinum(II) 2,8,12,17-tetraethyl-3,7,13,18-tetramethylporphyrin (PtOX), and an Ir(III) compound, fac-tris[2-(4',5'-difluorophenyl)pyridine-C'2,N] iridium(III) (FIrppy). The maximum external quantum efficiency of phosphorescent structures was 0.6% for the Pt dyes and $\approx 1.8\%$ for FIrppy. An overall increase in phosphorescence efficiency vs. similar structures based on fluorescence is attributed to the fact that phosphorescent dyes allow both singlet and triplet excitons to be involved in emission. The dopant concentration and organic layer thickness influence

the

performance of the diode structure. Introduction of an electron injecting layer of tris(8-hydroxyquinoline) aluminum(III) causes an increase of quantum efficiency of up to 1.8-2.8%. The second order quenching process in the OLEDs, which is prevalent at high c.d., is most likely not due to T-T annihilation of excitons trapped at dopant sites, rather, it is due to T-T annihilation in the PVK matrix or trapped charge-triplet annihilation.

CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

Section cross-reference(s): 37, 76

IT Exciton

Luminescence, **electroluminescence**

Phosphorescence

Phosphorescence quenching

(optical properties and phosphorescence efficiency of

poly(N-vinylcarbazole)/Pt(II) and Ir(III) dopant emitters in OLEDs)

IT **Electroluminescent** devices

(organic **light emitting** diodes; optical properties and

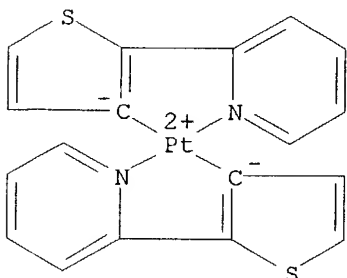
phosphorescence efficiency of poly(N-vinylcarbazole)/Pt(II) and Ir(III)

dopant emitters in OLEDs)

IT 100012-12-2 254104-18-2
 RL: DEV (Device component use); MOA (Modifier or additive use); PRP
 (Properties); USES (Uses)
 (optical properties and phosphorescence efficiency of
 poly(N-vinylcarbazole)/Pt(II) and Ir(III) dopant emitters in OLEDs)

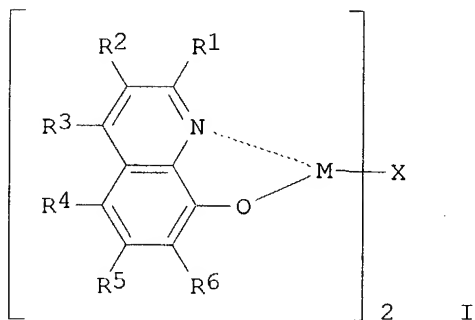
IT 100012-12-2
 RL: DEV (Device component use); MOA (Modifier or additive use); PRP
 (Properties); USES (Uses)
 (optical properties and phosphorescence efficiency of
 poly(N-vinylcarbazole)/Pt(II) and Ir(III) dopant emitters in OLEDs)

RN 100012-12-2 HCA
 CN Platinum, bis[2-(2-pyridinyl-κN)-3-thienyl-κC]-, (SP-4-2)-
 (9CI) (CA INDEX NAME)



L51 ANSWER 12 OF 16 HCA COPYRIGHT 2004 ACS on STN
 136:77068 Organic **electroluminescent** devices containing
 hydroxyquinoline-based complexes in positive hole-barrier layers. Sato,
 Yoshiharu; Sato, Hideki; Fugono, Masayo (Mitsubishi Chemical Corp.,
 Japan). Jpn. Kokai Tokkyo Koho JP 2002008860 A2 20020111, 17 pp.
 (Japanese). CODEN: JKXXAF. APPLICATION: JP 2000-135306 20000509.
 PRIORITY: JP 2000-116124 20000418.

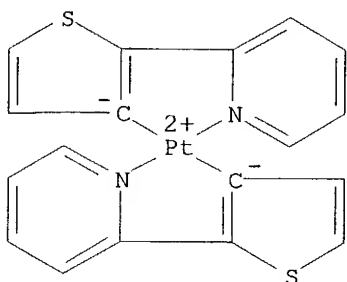
GI



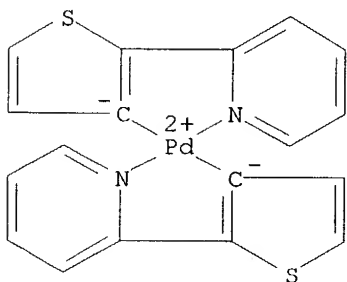
AB The devices, useful for a flat panel display, have substrates, anode
 layers, **electroluminescent** layers containing N-phenylcarbazole-based
 comps. and ≥ 1 Group 7-11 metal(s), pos. hole-barrier layers containing
 I (R1-6 H, substituent; M = Al, Ga, In; X = OAr1, OC:OAr2, OYAr3Ar4Ar5;

Arl-5 = aromatic ring, heterocycle; Y = Si, Ge), and cathode layers in this order. The devices may have pos. hole-transporting layers between the **electroluminescent** layers and the anode layers and electron-transporting layers between the barrier layers and the cathode layers. The devices show good driving stability under high c.d.

- IC ICM H05B033-14
ICS C09K011-06; H05B033-22
- CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
- ST org **electroluminescent** device driving stability;
hydroxyquinoline deriv pos hole barrier LED; phenylcarbazole iridium complex flat panel display
- IT **Electroluminescent** devices
(thin-film; organic **electroluminescent** devices with good driving stability having pos. hole-barrier layers containing hydroxyquinoline derivative complexes)
- IT 50926-11-9, ITO
RL: TEM (Technical or engineered material use); USES (Uses)
(anode layer; organic **electroluminescent** devices with good driving stability having pos. hole-barrier layers containing hydroxyquinoline derivative complexes)
- IT 7429-90-5, Aluminum, uses 7440-22-4, Silver, uses 7783-40-6, Magnesium fluoride
RL: TEM (Technical or engineered material use); USES (Uses)
(cathode layer; organic **electroluminescent** devices with good driving stability having pos. hole-barrier layers containing hydroxyquinoline derivative complexes)
- IT 58328-31-7 94928-86-6 100012-12-2
RL: TEM (Technical or engineered material use); USES (Uses)
(**electroluminescent** layer; organic **electroluminescent** devices with good driving stability having pos. hole-barrier layers containing hydroxyquinoline derivative complexes)
- IT 298706-32-8
RL: TEM (Technical or engineered material use); USES (Uses)
(electron-transporting layer; organic **electroluminescent** devices with good driving stability having pos. hole-barrier layers containing hydroxyquinoline derivative complexes)
- IT 157077-25-3
RL: TEM (Technical or engineered material use); USES (Uses)
(pos. hole-barrier layer; organic **electroluminescent** devices with good driving stability having pos. hole-barrier layers containing hydroxyquinoline derivative complexes)
- IT 123847-85-8, 4,4'-Bis[N-(1-naphthyl)-N-phenylamino]biphenyl
RL: TEM (Technical or engineered material use); USES (Uses)
(pos. hole-transporting layer; organic **electroluminescent** devices with good driving stability having pos. hole-barrier layers containing hydroxyquinoline derivative complexes)
- IT 100012-12-2
RL: TEM (Technical or engineered material use); USES (Uses)
(**electroluminescent** layer; organic **electroluminescent** devices with good driving stability having pos. hole-barrier layers containing hydroxyquinoline derivative complexes)
- RN 100012-12-2 HCA
- CN Platinum, bis[2-(2-pyridinyl-κN)-3-thienyl-κC]-, (SP-4-2)-(9CI) (CA INDEX NAME)



L51 ANSWER 13 OF 16 HCA COPYRIGHT 2004 ACS on STN
 135:84039 **Light-emitting** ortho palladium metal complex
 phosphors. Igarashi, Tatsuya (Fuji Photo Film Co., Ltd., Japan). Jpn.
 Kokai Tokyo Koho JP 2001181616 A2 20010703, 12 pp. (Japanese). CODEN:
 JKXXAF. APPLICATION: JP 1999-370350 19991227.
 AB An **electroluminescent** device employs the phosphor.
 IC ICM C09K011-06
 ICS H05B033-10; H05B033-14
 CC 73-5 (Optical, Electron, and Mass Spectroscopy and Other Related
 Properties)
 Section cross-reference(s): 29
 ST **electroluminescent** device palladium metal complex phosphor
 IT Isomers
 Luminescence
 Tautomerization
 (light-emitting ortho palladium metal complex
 phosphors)
 IT 852-38-0, PBD 25067-59-8, Poly(N-vinylcarbazole) 37271-44-6
 115756-71-3 118657-80-0 119782-36-4
 RL: DEV (Device component use); USES (Uses)
 (light-emitting ortho palladium metal complex
 phosphors)
 IT 115756-71-3
 RL: DEV (Device component use); USES (Uses)
 (light-emitting ortho palladium metal complex
 phosphors)
 RN 115756-71-3 HCA
 CN Palladium, bis[2-(2-pyridinyl-κN)-3-thienyl-κC]-, (SP-4-2)-
 (9CI) (CA INDEX NAME)



L51 ANSWER 14 OF 16 HCA COPYRIGHT 2004 ACS on STN

135:84035 **Light-emitting** ortho platinum metal complex phosphors. Igarashi, Tatsuya (Fuji Photo Film Co., Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 2001181617 A2 20010703, 12 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1999-370353 19991227.

AB An **electroluminescent** device employs the phosphor.

IC ICM C09K011-06
ICS H05B033-10; H05B033-14; H05B033-22

CC 73-5 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
Section cross-reference(s): 29

ST **electroluminescent** device platinum metal complex phosphor

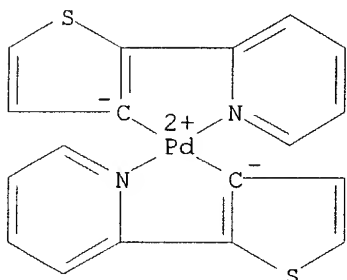
IT Isomers
Luminescence
Tautomerization
(**light-emitting** ortho platinum metal complex phosphors)

IT 852-38-0, PBD 25067-59-8, Poly(N-vinylcarbazole) 37271-44-6
115756-71-3 118657-80-0 119782-36-4
RL: DEV (Device component use); USES (Uses)
(**light-emitting** ortho platinum metal complex phosphors)

IT 115756-71-3
RL: DEV (Device component use); USES (Uses)
(**light-emitting** ortho platinum metal complex phosphors)

RN 115756-71-3 HCA

CN Palladium, bis[2-(2-pyridinyl-κN)-3-thienyl-κC]-, (SP-4-2)-
(9CI) (CA INDEX NAME)



L51 ANSWER 15 OF 16 HCA COPYRIGHT 2004 ACS on STN

134:101004 A blue luminescent starburst molecule and its orange luminescent trinuclear PdII complex: 1,3,5-tris(7-azaindol-1-yl)benzene (tabH) and [PdII3(tab)2Cl4]. Wu, Qingguo; Hook, Andrea; Wang, Suning (Dep. Chem., Queen's Univ., Kingston, ON, K7L 3N6, Can.). Angewandte Chemie, International Edition, 39(21), 3933-3935 (English) 2000. CODEN: ACIEF5. ISSN: 1433-7851. OTHER SOURCES: CASREACT 134:101004. Publisher: Wiley-VCH Verlag GmbH.

AB The starburst mol. 1,3,5-tris(7-azaindol-1-yl)benzene (tabH) was prepared and its blue luminescence was studied. TabH is promising as a blue **emitter** in organic **light-emitting** devices (OLED's). Reaction of tabH with K2PdCl4 afforded [PdII3(tab)2Cl4]. The trinuclear complex structure was determined by single-crystal x-ray diffraction anal. The benzene rings in the tab- ligands underwent cyclometalation. At ambient temperature the palladium complex has no luminescence. At 77 K, upon

excitation at $\lambda = 370$ nm, an orange emission band at $\lambda_{\text{max}} = 575$ nm was observed

CC 29-14 (Organometallic and Organometalloidal Compounds)

Section cross-reference(s): 22, 73, 75

IT 319430-92-7P

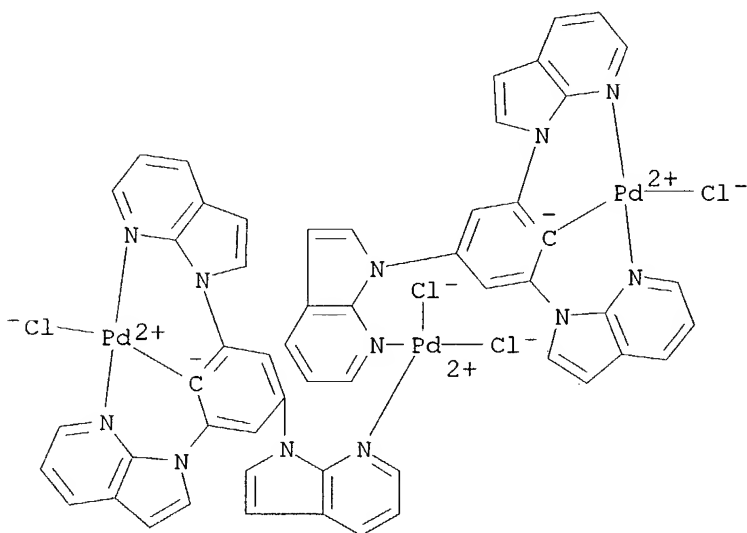
RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)
(preparation, crystal structure, and orange luminescence of)

IT 319430-92-7P

RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)
(preparation, crystal structure, and orange luminescence of)

RN 319430-92-7 HCA

CN Palladium, tetrachlorobis[μ -[2,4,6-tris(1H-pyrrolo[2,3-b]pyridin-1-yl- κ N7)phenyl- κ C]]tri-, stereoisomer (9CI) (CA INDEX NAME)



L51 ANSWER 16 OF 16 HCA COPYRIGHT 2004 ACS on STN

133:274030 Cyclometallated metal complexes as phosphorescent dopants in organic LEDs. Lamansky, Sergey; Thompson, Mark E. (The University of Southern California, USA). PCT Int. Appl. WO 2000057676 A1 20000928, 32 pp. DESIGNATED STATES: W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG. (English). CODEN: PIXXD2. APPLICATION: WO 2000-US7574 20000322. PRIORITY: US 1999-274609 19990323.

AB Organic **light-emitting** devices with heterostructure active layers comprising a host material doped with an emitting materials are described in which the emitting material is a phosphorescent organometallic complex, especially cyclometallated platinum complexes. The devices may addnl. incorporate polarizing dopants (e.g., aromatic compds.) which affect the emission wavelength. The devices may be display devices. A method for tuning the emitted wavelength by selection of the host and dopant materials is also described.

IC ICM H05B033-12

CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
 Section cross-reference(s): 74, 76, 78

ST **light emitting** device phosphorescent organometallic complex; cyclometallated platinum complex **light emitting** device

IT Phosphors
 (electroluminescent; organic **light-emitting** devices using phosphorescent organometallic complexes as dopants)

IT **Electroluminescent** devices
 (organic **light-emitting** devices using phosphorescent organometallic complexes as dopants)

IT 9003-53-6, Polystyrene 25067-59-8, Polyvinylcarbazole
 RL: DEV (Device component use); USES (Uses)
 (organic **light-emitting** devices using phosphorescent organometallic complexes as dopants)

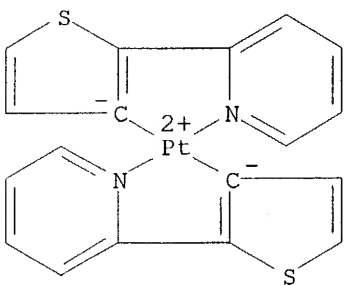
IT 88821-71-0
 RL: DEV (Device component use); MOA (Modifier or additive use); PRP (Properties); USES (Uses)
 (organic **light-emitting** devices using phosphorescent organometallic complexes as dopants)

IT **100012-12-2P 100012-13-3P 128025-34-3P**
 RL: DEV (Device component use); MOA (Modifier or additive use); PRP (Properties); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
 (organic **light-emitting** devices using phosphorescent organometallic complexes as dopants)

IT **100012-12-2P 128025-34-3P**
 RL: DEV (Device component use); MOA (Modifier or additive use); PRP (Properties); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
 (organic **light-emitting** devices using phosphorescent organometallic complexes as dopants)

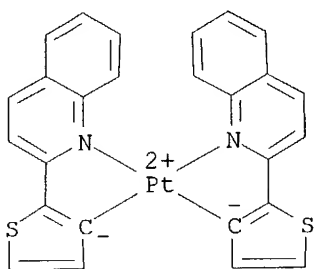
RN 100012-12-2 HCA

CN Platinum, bis[2-(2-pyridinyl-κN)-3-thienyl-κC]-, (SP-4-2)-(9CI) (CA INDEX NAME)



RN 128025-34-3 HCA

CN Platinum, bis[2-(2-quinolinyl-κN)-3-thienyl-κC]-, (SP-4-2)-(9CI) (CA INDEX NAME)



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